

IN THE CLAIMS

1. (Currently Amended) A circuit enabling a ~~headphone~~ driver amplifier to operate from a single voltage supply comprising:

an amplifier having an output coupled to a ~~load~~ ~~headphone~~, said amplifier having a first and second power supply lead, said first power supply lead connected to a power supply voltage; and

a charge pump DC voltage to voltage converter having an output, said DC voltage to voltage converter having a power source lead connected to the supply voltage, the output of said DC voltage to voltage converter connected to the second power supply lead, and said DC voltage to voltage converter generating an output voltage at the output that is substantially equal in magnitude to some negative quanta of the power supply voltage.

2. (Original) The circuit of claim 1 connected to common ground by two external capacitors in the range of 0.47 to 3.3 micro farads.

3. (Cancelled)

4. (Cancelled)

5. (Original) The circuit of claim 1 wherein the power supply voltage is a positive voltage.

6. (Original) The circuit of claim 1 wherein the power supply voltage is a negative voltage.

7. (Original) An amplifier circuitry for directly driving stereo headphones, said amplifier circuitry being driven by a single supply voltage VDD, said amplifier circuitry comprising:

a first and a second amplifier, the first amplifier having an output directly coupled to a first headphone and the second amplifier having an output directly coupled to a second headphone, each of the first and second amplifier having a VDD power supply lead connected to a positive voltage supply VDD; and

a charge pump circuitry output connected to a -VDD supply voltage of the first and second amplifier, wherein said charge pump circuitry output provides a voltage substantially equal in magnitude to the negative value of the VDD supply, said charge pump further having a power supply lead connected to the VDD supply voltage.

8. (Currently Amended) An portable amplifier system operative with a single voltage supply VDD, for directly driving a headphone comprising:

signal amplifying means for driving a headphone, said amplifying means output directly coupling the headphone, said amplifying means biased to ground voltage; and

negative voltage generator means for inverting an input voltage supply VDD to an output voltage supply -VDD of equal magnitude but opposite sign, said voltage supply generator means output coupled to the negative voltage lead -VDD of said amplifying means, said negative voltage generator means being a charge pump type of generator means.

9. (Currently Amended) A headphone system operative with a single positive supply voltage comprising:

at least one headphone,

signal amplifying means driving the headphone, said amplifying means is directly coupled to the headphone and biases the headphone at zero volts; and

a negative voltage generator means providing a negative voltage substantially equal to but negative in magnitude to the positive voltage supply said negative voltage generator means being a charge pump type of generator means.

10. (Cancelled)

11. (Currently Amended) A method of directly driving a load in a portable device operative off of a single voltage supply VDD comprising:

driving a headphone using a signal amplifying means having an output, wherein said output directly coupling the headphone, said amplifying means biased to ground voltage; and

inverting an input voltage using a charge pump negative voltage generator means for inverting a voltage supply VDD to an output voltage, said output voltage being substantially equal to some negative quanta of the voltage supply VDD, said negative voltage supply generator means output coupled to the negative voltage lead -VDD of said amplifying means.

12. (New) A circuit enabling a driver amplifier to operate from a single voltage supply as recited in Claim 1, wherein said load is a headphone.

13. (New) A direct drive charge pump enabled stereo headphone system comprising the following formed on a single integrated circuit:

a single power input for providing, internal to said integrated circuit, a VDD supply voltage originating external to said integrated circuit;

a charge pump coupled to said single power input and operable to provide, internal to said integrated circuit, a voltage substantially equal in magnitude to the negative value of said external VDD supply;

a first headphone amplifier powered by both said external VDD supply and said voltage substantially equal in magnitude to the negative value of said external VDD supply, said first headphone amplifier having a first audio input driven by a first audio signal provided external to said integrated circuit, and a first audio output suitable for directly driving a stereo headphone;

a second headphone amplifier powered by both said external VDD supply and said voltage substantially equal in magnitude to the negative value of said external VDD supply, said second headphone amplifier having a second audio input driven by a second audio signal provided external to said integrated circuit, and a second audio output suitable for directly driving said stereo headphone; and

whereby a single ground reference may be used for both said headphone system and said stereo headphone such that substantially no DC bias voltage exists across said first audio input and said second audio input with reference to said stereo headphone.

14. (New) A direct drive charge pump enabled stereo headphone system as recited in Claim 13, wherein said first audio input is an audio in for a right stereo headphone and said second audio input is an audio in for a left stereo headphone.

15. (New) A direct drive charge pump enabled stereo headphone system as recited in Claim 13, wherein said first audio input is coupled to an inverting terminal of said first headphone amplifier and said second audio input is coupled to an inverting terminal of said second headphone amplifier.

16. (New) A direct drive charge pump enabled stereo headphone system as recited in Claim 15, wherein a non-inverting terminal of said first headphone amplifier is coupled to a non-inverting terminal of said second headphone amplifier.

17. (New) A direct drive charge pump enabled stereo headphone system as recited in Claim 16, wherein said non-inverting terminal of said first headphone amplifier and said non-inverting terminal of said second headphone amplifier are coupled to ground.

18. (New) A direct drive charge pump enabled stereo headphone system as recited in Claim 13, further comprising:

a first resistor coupled to said first audio input and an inverting terminal of said first headphone amplifier,

a second resistor coupled to said first audio output and said inverting terminal of said first headphone amplifier,

a third resistor coupled to said second audio input and an inverting terminal of said second headphone amplifier, and

a fourth resistor coupled to said second audio output and said inverting terminal of said second headphone amplifier.

19. (New) A direct drive charge pump enabled stereo headphone system as recited in Claim 13, further comprising:

a first capacitor having a first lead and a second lead, said first lead coupled to said charge pump and said second lead coupled to said charge pump, said first capacitor located off said integrated chip, and

a second capacitor having a first lead and a second lead, said first lead coupled to said charge pump and said second lead couple to ground, said second capacitor located off said integrated chip.

20. (New) A direct drive charge pump enabled stereo headphone system as recited in Claim 13, further comprising a short circuit protection device.

21. (New) A direct drive charge pump enabled stereo headphone system as recited in Claim 13, further comprising a bias circuitry device.

22. (New) A direct drive charge pump enabled stereo headphone system as recited in Claim 13, wherein said first audio output is an audio out for a right stereo headphone and said second audio output is an audio out for a left stereo headphone.

23. (New) A direct drive charge pump enabled stereo headphone system as recited in Claim 13, further comprising a click / pop suppression device coupled to said first headphone amplifier and said second headphone amplifier.

24. (New) A direct drive charge pump enabled stereo headphone system as recited in Claim 13, further comprising a shutdown control device coupled to said charge pump.

25. (New) A direct drive charge pump enabled stereo headphone system as recited in Claim 23, further comprising a shutdown control device coupled to said charge pump and said click / pop suppression device.

26 (New) A direct drive charge pump enabled stereo headphone system as recited in Claim 13, further comprising:

a first capacitor having a first lead and a second lead, said first lead coupled to a non-inverting terminal of said first headphone amplifier and said second lead coupled to said first audio input, said first capacitor located off said integrated chip, and

a second capacitor having a first lead and a second lead, said first lead coupled to a non-inverting terminal of said second headphone amplifier and said second lead coupled to said second audio input, said second capacitor located off said integrated chip.